

EXHIBIT 9

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

CAPELLA PHOTONICS, INC.

Plaintiff,

v.

FUJITSU NETWORK

COMMUNICATIONS, INC.,

Defendants.

CAPELLA PHOTONICS, INC.

Plaintiff,

v.

INFINERA CORPORATION, TELLABS,
INC., TELLABS OPERATIONS INC.,
CORIANT AMERICA INC., and CORIANT
(USA) INC.,

Defendants.

Case No. 2:20-cv-00076-JRG

JURY TRIAL DEMANDED

Case No. 2:20-cv-00077-JRG

JURY TRIAL DEMANDED

EXPERT REPORT OF DR. ALEXANDER V. SERGIENKO

TABLE OF CONTENTS

| | | |
|-------|--|----|
| I. | Introduction..... | 1 |
| II. | Qualifications | 1 |
| III. | Materials Considered | 3 |
| IV. | Understanding of Legal Principles..... | 4 |
| | A. Anticipation..... | 4 |
| | B. Obviousness | 4 |
| | C. Antedating..... | 6 |
| | D. Analogous Art..... | 8 |
| | E. Motivation to Combine and Hindsight | 8 |
| | F. Person Having Ordinary Skill in the Art..... | 9 |
| | G. Written Description..... | 10 |
| | H. Clear and Convincing Evidence..... | 10 |
| V. | Prosecution History of the '905 and '906 Patents | 11 |
| VI. | Summary of Opinions | 12 |
| VII. | Swear Behind | 13 |
| | A. The inventors conceived of the claimed subject matter by at least November 28, 2000..... | 13 |
| | B. The inventors at least constructively reduced their invention to practice at the latest by March 19, 2001..... | 14 |
| | C. Evidence shows diligence during any of the critical periods..... | 15 |
| VIII. | Written Description..... | 16 |
| | A. Beam-Deflecting Elements: | 17 |
| | B. Continuous Control..... | 19 |
| | C. Individual Control..... | 20 |
| IX. | Nonobviousness | 20 |
| | A. U.S. Patent No. 6,798,941 (“Smith”)..... | 21 |

| | | |
|-----------|--|-----------|
| 1. | Overview of Smith | 22 |
| 2. | Global arguments for all claims | 25 |
| 3. | Missing Elements in Smith | 28 |
| 4. | The proposed obviousness combinations using Smith are flawed..... | 32 |
| 5. | Dr. Lebby admits that Smith is missing at least the following features:..... | 32 |
| B. | U.S. Patent No. 6,097,859 (“Solgaard”) | 34 |
| 1. | Overview of Solgaard | 35 |
| 2. | Global arguments for all claims | 35 |
| 3. | Missing Elements in Solgaard | 37 |
| 4. | The proposed obviousness combinations using Solgaard are flawed | 44 |
| 5. | Dr. Lebby admits that Solgaard is missing many features..... | 45 |
| C. | U.S. Patent No. 6,978,062 (“Rose”) | 47 |
| 1. | Overview of Rose | 47 |
| 2. | Global arguments for all claims | 48 |
| 3. | Missing Elements in Rose..... | 50 |
| 4. | The proposed obviousness combinations using Rose are flawed | 55 |
| 5. | Dr. Lebby admits that Rose is missing several features. | 55 |
| D. | U.S. Patent No. 6,583,934 (“Kramer”) | 57 |
| 1. | Overview of Kramer | 57 |
| 2. | Global arguments for all claims | 58 |
| E. | U.S. Patent No. 7,106,966 (“Lalonde ”)..... | 59 |
| 1. | Overview of Lalonde | 59 |
| 2. | Global arguments for all claims | 59 |
| 3. | Missing Elements in Lalonde | 61 |

| | | |
|----|--|-----|
| 4. | <i>The proposed obviousness combinations using Lalonde are flawed</i> | 67 |
| 5. | <i>Mr Lebby admits that Lalonde is missing several features.</i> | 67 |
| F. | U.S. Patent No. 6,498,872 (“Bouevitch”)..... | 68 |
| 1. | Overview of Bouevitch..... | 68 |
| 2. | Global Arguments for all claims..... | 68 |
| 3. | Missing Elements in Bouevitch | 69 |
| 4. | The proposed obviousness combinations using Bouevitch are flawed..... | 72 |
| 5. | Dr. Lebby admits that Bouevitch is missing claim features | 76 |
| G. | U.S. Patent No. 6,625,340 (“Sparks”) | 77 |
| 1. | Overview of Sparks..... | 77 |
| 2. | Sparks does not teach or suggest the recited ports..... | 78 |
| 3. | The proposed obviousness combinations using Sparks are flawed | 80 |
| 4. | Dr. Lebby admits that Sparks is missing many claim features | 81 |
| H. | U.S. Patent No. 6,442,307 (“Carr”) | 82 |
| 1. | Overview of Carr | 82 |
| 2. | Missing Elements: Carr does not teach or suggest “maintaining a predetermined coupling of each reflected spectral channel into one of said fiber collimator output ports by adjusting micromirrors.” | 83 |
| I. | <i>U.S. Patent No. 6,816,640 (“Tew ’640”)</i> | 84 |
| 1. | <i>Overview of Tew ’640</i> | 84 |
| 2. | <i>Global arguments for all claims</i> | 84 |
| 3. | <i>Missing Elements in Tew ’640</i> | 85 |
| 4. | <i>Obviousness Combinations using Tew ’640</i> | 126 |
| J. | <i>U.S. Patent No. 6,618,520 (“Tew ’520”)</i> | 161 |
| 1. | <i>Global Comments</i> | 161 |

| | | |
|----|--|-----|
| 2. | <i>Missing Elements</i> | 161 |
| K. | U.S. Patent No. 2002/0081070 (“Tew ’070”)..... | 161 |
| 1. | Global Comments | 161 |
| 2. | Cited During Prosecution..... | 162 |
| 3. | Missing Elements..... | 162 |
| L. | Yuan & Riza, “General Formula for Coupling-loss Characterization of Single-mode Fiber Collimators by Use of Gradient-index Rod Lenses” (“Yuan”)..... | 162 |
| 1. | Global Comments | 162 |
| 2. | Missing Elements..... | 163 |
| X. | <i>Conclusions</i> | 163 |

I. Introduction

1. My name is Alexander V. Sergienko. Capella Photonics, Inc. has retained me as an expert witness. I have been asked to provide my expert opinion in connection with Capella Photonics, Inc. v. Fujitsu Network Communications, Inc., Case No. 2:20-CV-0076-JRG (E.D. Tex.) and Capella Photonics, Inc. v. Infinera Corporation, et al., Case No. 2:20-CV-0077-JRG (E.D. Tex.).

2. In this report, I set forth opinions in response to those filed by Dr. Michael S. Lebby, on March 15, 2021. My technical review, analysis, insights, and opinions are based on over 35 years of education, research, and experience, as well as my study of relevant materials.

3. I am being compensated for my work at a rate of \$400.00 per hour. My compensation is not contingent upon and in no way affects the substance of my testimony.

II. Qualifications

4. I received my Ph.D. in Physics from Moscow State University in 1987 and my Master of Science Degree in Physics from Moscow State University in 1981.

5. I am currently a full professor at Boston University where I hold joint appointments in the Photonics Center, the Department of Electrical and Computer Engineering, and the Department of Physics. My expertise and research interests include optics, photonics, quantum physics, laser physics, nonlinear optics, and precise optical measurement in telecommunication and optical engineering.

6. I have experience and familiarity with the technical areas involved in this case. With over 35 years of research experience in the field of optics, I have studied and worked with optical components such as those at issue in this case. For example, during my tenure as a Director of the Quantum Communication and Measurement Laboratory at the Boston University Photonics Center, I developed quantum optical technologies for high-resolution evaluation of

obviousness combinations often purport to mix and match elements from very different technologies, using some elements in ways that would defeat their purpose.

50. A person of ordinary skill in the art would not deconstruct the references in the way that Dr. Lebby does, only to reconstruct them in combination with very different elements, with the apparent hindsight objective of arriving at the asserted claims. I go through each of the alleged combinations identified in Dr. Lebby's report below, and explain why the asserted references either would not have been combined, would not have been combined in the specific way that Dr. Lebby combines them, and/or why Dr. Lebby's proposed combination still does not teach every limitation of the asserted claims.

VII. Swear Behind

51. Dr. Lebby ignores publically available conception and constructive reduction to practice information that remove certain references as prior art. Had Dr. Lebby properly considered the critical date of the asserted patents, he would have realized that some of the references one which he relies do not even qualify as prior art in the first place.

A. The inventors conceived of the claimed subject matter by at least November 28, 2000.

52. The inventors conceived of the claimed subject matter by at least November 28, 2000. Conception is the mental formulation and the disclosure of a complete idea for the claimed subject matter. *Townsend v. Smith*, 36 F.2d 292, 295 (CCPA 1929). Conception is complete when the idea encompasses all limitations of the claimed subject matter. *Singh v. Brake*, 317 F.3d 1334, 1340 (Fed. Cir. 2003). In cases where there are physical exhibits, no corroboration is required. *Mahurkar v. CR Bard, Inc.*, 79 F.3d 1572, 1577-78 (Fed. Cir. 1996).

53. U.S. Provisional Application No. 60/277,217 ("Capella Provisional") Appendices A-D contain signed and dated disclosure pages establishing that the invention was conceived by

at least November 28, 2000 if not earlier. *See* CAP_0002098-CAP_0002109. And the claims of the '905 and '906 patents are fully supported by those signed and dated disclosures found in the Capella Provisional. The claim chart in Appendix C provides a claim-by-claim analysis and shows Capella Provisional Appendixes A-D of disclose every element of asserted claims 23-29, 31-35, 37, 39, and 44-54 of the '905 patent and 68-72, 79-92, 96-100, 106, 115-118, 122-127, 129-135, and 137-139 of the '906 patent, and would have enabled a POSA to make and use the invention. As the claim chart shows, the inventors were in possession of the claimed subject matter by at least November 28, 2000 if not earlier.

B. The inventors at least constructively reduced their invention to practice at the latest by March 19, 2001.

54. If not actually reduced in the November 28, 2000 document of Capella Provisional, the inventors constructively reduced their invention to practice at least by March 19, 2001, when Capella Provisional was filed. Capella Provisional provides a constructive reduction to practice. For a constructive reduction to practice, an earlier application must contain written description of the subject matter to enable a POSA to make and use the invention without undue experimentation. *Hyatt v. Boone*, 146 F.3d 1348, 1352 (Fed. Cir. 1998). Here, the '905 and '906 patents claims priority to Capella Provisional and Capella Provisional provides a constructive reduction to practice.

55. The '905 and '906 patents have been examined and determined to be fully supported by that Capella Provisional, which describes every claim element in sufficient detail to enable a POSA to make and use the invention without undue experimentation.

C. Evidence shows diligence during any of the critical periods.

56. The inventors were reasonably diligent from at least November 28, 2000 until at least the constructive reduction to practice. Diligence for a constructive reduction to practice can be met by showing the activity to prepare the patent application of which priority is sought or other applications similar in scope. *Rey Bellet v. Engelhardt*, 493 F.2d 1380, 1388 (CCPA 1974). Diligence for a constructive reduction to practice can also be met showing activity towards an actual reduction to practice. *Keizer v. Bradley*, 270 F.2d 396, 400 (CCPA 1959); *Rey-Bellet v. Engelhardt*, 493 F.2d 1380, 1388 (CCPA 1974); *ATI Techs. ULC v. Iancu*, 920 F.3d 1362, 1370-74 (Fed. Cir. 2019); *Scott v. Koyama*, 281 F.3d 1243, 1248-49 (Fed. Cir. 2002) (activity for building a manufacturing plant was sufficient to show diligence leading up to a constructive reduction to practice).

57. “A patent owner need not prove the inventor *continuously* exercised reasonable diligence throughout the critical period; it must show there was *reasonably continuous* diligence.” *Perfect Surgical Techniques, Inc. v. Olympus Am., Inc.*, 841 F.3d 1004, 1009 (Fed. Cir. 2016); *see also* *ATI Techs. ULC v. Iancu*, 920 F.3d 1362, 1369 (Fed. Cir. 2019); *Arctic Cat Inc. v. GEP Power Prod., Inc.*, 919 F.3d 1320, 1331-32 (Fed. Cir. 2019) (evidence showed reasonably continuous diligence despite gaps). “[T]he purpose of the diligence requirement is to show that the invention was not abandoned or set aside.” *ATI Techs.*, 920 F.3d at 1373.

58. Here, the diligence period spans from November 28, 2000 to at least the inventors’ constructive reduction to practice March 19, 2001. To show diligence during any of these periods, Capella relies on the signed and dated disclosure pages in Capella Provisional Appendixes A-D. The evidence shows that the inventors were diligently working on the conceived invention during the critical period to constructively reduce their invention to practice and/or file Capella Provisional. For example, the disclosure pages dated December 28, 2000 and

signed January 3, 2001 in Capella Provisional Appendix C show the reconfigurable OADM with dynamic equalization improved by the inventors. *See* CAP_0002105-CAP_0002107. The disclosure pages dated January 9, 2001 in Appendix D show the technical specifications for dynamic optical add/drop multiplexer set up by the inventors. *See* CAP_0002108-CAP_0002109.

59. Capella has shown conception by at least November 28, 2000 and constructively reduced to practice by at least March 19, 2001, and reasonable diligence from November 28, 2000 to a constructive reduction to practice.

VIII. Written Description

60. Despite multiple Examiners at the U.S. Patent and Trademark Office examining the same claim terms several times, and allowing the claims each time without asserting any written description issues, Dr. Lebbly asserts that “claims 23–29, 31–35, 37, 39, and 44–54 of the ’905 Patent and claims 68–72, 79–85, 87–92, 96–100, 106, 115–118, 122–127, 129–135, and 137–139 of the ’906 Patent are invalid for lack of written description under pre-AIA 35 U.S.C. § 112, ¶ 1.” Lebbly [0239].

61. Dr. Lebbly does not appear to allege that the claim terms are lacking written description support in the Specification, rather, he appears to be arguing that the claim construction adopted by the Court is not supported by the Specification.

- [The Court’s claim construction decision is informative here because it is based on the intrinsic record.]

62. It is my understanding that Courts begin their claim construction analyses “by considering the *intrinsic evidence*.” Markman Order, 9 (citing *C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc’ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001)) (emphasis added).

177. In addition, there is no motivation to combine Solgaard with Sparks, Smith, Lalonde, and/or Bouevitch to obtain the claimed “pivoting about two axes and continuously controllable.” Solgaard recites “[t]he side mirrors also have a state that is half way between the flat state and the fully pulled-down state. This may be achieved by having continuous control over the mirror angles,” and “[c]harge control utilizes the full range of motion of the mirrors but complicate the driver circuitry for the switch. It may be preferable to use electrode geometry to achieve the *required number of states*.” Solgaard, 6:57-7:20. Solgaard discourages full range of motion of the mirrors and prefers to achieve the required number of states.

C. U.S. Patent No. 6,978,062 (“Rose”)

178. Dr. Lebby’s obviousness analysis with respect to Rose is deficient in many respects. Dr. Lebby provides no analysis to show how Rose in combination with other references teaches the claimed limitations of the ’905 and ’906 patents. Dr. Lebby throughout his report provides nothing more than a mere conclusory statement, with no accompanying analysis, and often reverts to blanket statements that it would have been obvious to a POSA to combine these references. Often, no specific elements in the references are pointed to, and one is left wondering what specific elements in the references should be combined with one another to obtain the claimed elements of the ’905 and ’906 patents. This level of analysis is insufficient to show obviousness because Dr. Lebby does not explain why it would have been obvious to a POSA to combine the references and how combining the references discloses the claimed limitations. As I will explain, a POSA would not have found it obvious to combine Rose with the references Dr. Lebby points to.

1. Overview of Rose

179. Rose describes an optical device 3100 that “permits selective switching of different channels into different outputs, and may be regarded as being a multiple output drop filter” or “a multiple input add filter.” Rose, 18:10-19:6. Device 3100 includes switch array 3104, transmission gratings (not shown), and fibers 3302, 3340, 3318, 3344, and 3346 with respective focusing systems 3306, 3350, 3320, 3354, and 3356. *Id.*, 18:42-18:63.

2. *Global arguments for all claims*

180. The effective filing date of Rose is February 21, 2001. Dr. Lebby erroneously claims Rose claims priority to Application No. 09/474,544 filed on December 29, 1999, and issued on September 23, 2003. The inventors of Application No. 09/474,544 include Sparks, Spagnoletti, and Henshall, but no common inventor with Rose.

181. Rose is not prior art and Dr. Lebby fails to prove Rose is prior art in view of publicly known invention date documents found in the Capella Provisional showing Capella’s invention antedate Rose. The date of invention for the ’905 and ’906 patents is clearly cited in U.S. Provisional Application No. 60/277,217 (“Capella Provisional”), which is cited on the face page of the ’905 and ’906 patents. *See* CAP_0002098-CAP_0002109. The Capella Provisional contains signed and dated disclosure pages establishing that the invention was conceived by at least November 28, 2000, earlier than February 21, 2001, effective filing date of Rose.

182. Dr. Lebby tacitly admits that Rose (and other references) are deficient for teaching various claim features, but then tries to bridge the gap with meritless conclusory statements. Lebby Report, ¶¶ 1525, 1528, 1532, 1543, 1551, 1569, 1574, 1641, 1649, 1651, 1663, 1664, 1666, 1678, 1680, 1700, 1737, 1744, 1746, 1750, 1751, 1754, 1755, 1757, and 1761. For example:

- Dr. Lebby concludes: “To the extent that “fiber collimator” port requires a collimator and a port in a single package, a POSITA would have known to combine a collimator

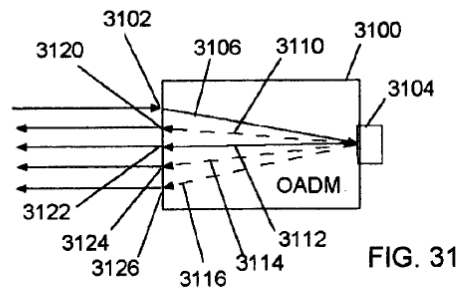


FIG. 31

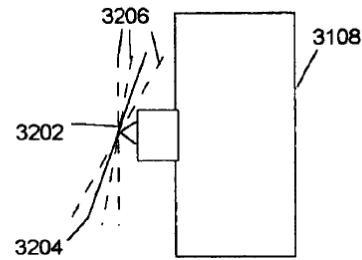


FIG. 32

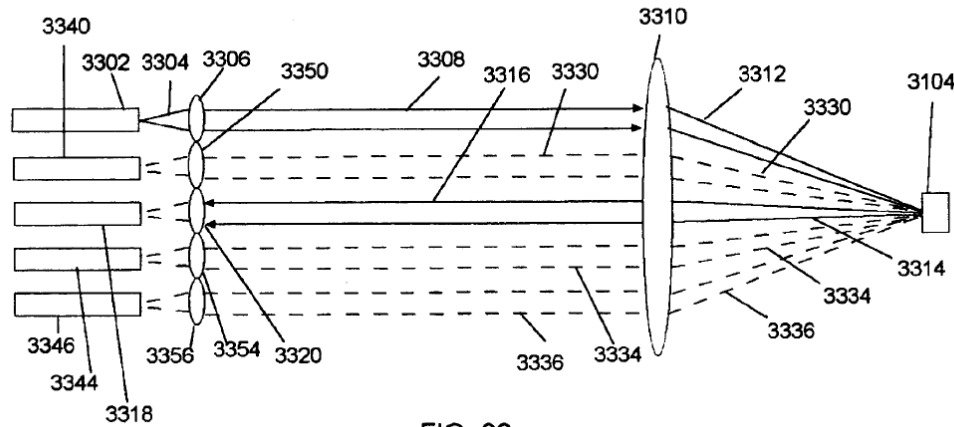


FIG. 33

Rose, Figs. 31-33.

216. As shown in Fig. 32 of Rose, “[t]he switch 3108 has a reflector 3202 that is selectively movable among several different positions” and “[t]he switches 3108 are selectively operable between a number of positions, four in the illustrated embodiments, that correspond to different paths.” Rose also recites “[i]t will be appreciated that the switch may be selectively adjustable between a number of positions that is different from four.” Rose, 18:10-41.

217. Dr. Leby provides nothing more than a mere conclusory statement, with no accompanying analysis, that it is obvious to combine Rose with other references to achieve “individually and continuously controllable in two dimensions.” Leby Report, ¶¶1995-1998.

D. U.S. Patent No. 6,583,934 (“Kramer”)

1. Overview of Kramer

218. Kramer describes an optical wavelength selection apparatus containing a surface-relief transmission diffraction grating, a collimating lens for collimating a beam incident to the diffraction grating, and a focusing lens for focusing the beams diffracted by the diffraction grating. Kramer, Abstract.

2. Global arguments for all claims

219. Kramer was cited on the cover of the '905 and '906 patents and was fully considered during prosecution of the '905 and '906 patents based on a Notice of References Cited on June 26, 2019. *See* CAP_0014445. In view of the references cited in previous IPRs, and the references cited on the cover of the '905 and '906 patents, the Examiner expressly stated that “the ‘input collimator’ and/or ‘pass-through’ collimator in combination with the other limitations of the claims is enough to place the claims in condition for allowance.” *See* CAP_0004728.

220. Kramer is not prior art and Dr. Lebby fails to prove Kramer is prior art in view of publicly known invention date documents antedating Kramer. The date of invention for the '905 and '906 patents are clearly cited in U.S. Provisional Application No. 60/277,217 (“Capella Provisional”), which is cited on the face page of the '905 and '906 patents. *See* CAP_0002098-CAP_0002109. The Capella Provisional contains signed and dated disclosure pages establishing that the invention was conceived by at least November 28, 2000, earlier than January 16, 2001, effective filing date of Kramer.

221. Dr. Lebby uses Kramer for purportedly disclosing “fiber collimators” and “not sending signals through a circulator.” Lebby Report, ¶¶1818-1824. However, Dr. Lebby tacitly admits that Kramer is deficient for teaching “fiber collimator” and “not sending signals through a circulator,” and then tries to bridge the gap with meritless conclusory statements. Specifically, Dr. Lebby concludes: “Even if Kramer does not do so, however, these limitations would have

574. Based on reviewing Dr. Lebby's expert report, it is my understanding that Yuan is used only for purportedly disclosing "fiber collimators" and not used to disclose any other elements of the '905 patent. Lebby Report, ¶¶1825-1829. With respect to the obviousness combinations that Dr. Lebby relies on Yuan, I have addressed the deficiencies of Yuan with respect to those combinations. For the reasons stated in those sections, it is my opinion that Yuan cannot be combined with any other references to render obvious the claims of the '905 and '906 patents.

2. *Missing Elements*

575. Yuan does not disclose many of the claimed elements in the '905 and '906 patents. As previously indicated, Yuan is only used by Dr. Lebby for its purported disclosure of "fiber collimators" and not used to disclose any other elements of the '905 and '906 patents. Thus, in my opinion, Dr. Lebby recognizes that Yuan does not disclose any other elements of the '905 and '906 patents.

X. *Conclusions*

576. After carefully examining each of Dr. Lebby's theories of obviousness for the challenged claims, I conclude that none of them invalidated any of the asserted claims. Most of Dr. Lebby's opinions are fundamentally flawed in some way, either by considering references that are not prior art, failing to explain how references would be combined or even which aspects of different references would be combined, or failing to account for each and every limitation of the asserted claims even with the prior-art combinations he uses. Even for the few prior-art combinations that are not fundamentally flawed, Dr. Libby still errs in his technical analysis of why or how these references could be combined or the results of that combination. In my expert opinion, all of the asserted claims of the '905 and '906 patents are novel and nonobviousness.

I declare under penalty of perjury under the laws of the United States that the foregoing is true and correct.

Executed on this 5th day of April, 2021.

By: Alex. Sergienko

Alexander V. Sergienko